



**United States  
Department of  
Agriculture**

**Agricultural  
Marketing  
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**Fruit and  
Vegetable  
Programs**

**Fresh  
Products  
Branch**

# **United States Standards for Grades of Potatoes**

**Effective April 21, 2008**

# United States Standards for Grades of Potatoes <sup>1</sup>

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<sup>1</sup>Packing of the product in conformity with requirements of these standards shall not excuse failure to comply with the provisions of the Federal Food and Drug Cosmetic Act or with applicable State laws and regulations.

## **Grades**

### **§51.1540 [Reserved].**

### **§51.1541 U.S. No. 1.**

"U.S. No. 1" consists of potatoes which meet the following requirements:

- (a) Similar varietal characteristics;
- (b) Firm;
- (c) Fairly clean;<sup>2</sup>
- (d) Fairly well shaped;
- (e) Free from:
  - (1) Freezing;
  - (2) Blackheart;
  - (3) Late blight, southern bacterial wilt and ring rot; and,
  - (4) Soft rot and wet breakdown.
- (f) Free from damage by any other cause. See §§51.1564 and 51.1565.
- (g) Size. Not less than 1-7/8 inches in diameter, unless otherwise specified in connection with the grade.
- (h) For tolerances see §51.1546.

### **§51.1542 U.S. Commercial.**

"U.S. Commercial" consists of potatoes which meet the requirements of U.S. No. 1 grade except for the following:

- (a) Free from serious damage caused by:
  - (1) Dirt or other foreign matter;
  - (2) Russet scab; and,
  - (3) Rhizoctonia.
- (b) Increased tolerances for defects specified in §51.1546.

### **§51.1543 U.S. No. 2.**

"U.S. No. 2" consists of potatoes which meet the following requirements:

- (a) Similar varietal characteristics;
- (b) Not seriously misshapen;
- (c) Free from:
  - (1) Freezing;
  - (2) Blackheart;
  - (3) Late blight, southern bacterial wilt and ring rot; and,
  - (4) Soft rot and wet breakdown.
- (d) Free from serious damage by any other cause. See §§51.1564 and 51.1565.
- (e) Size. Not less than 1-1/2 inches in diameter, unless otherwise specified in connection with the grade.
- (f) For tolerances see §51.1546.

### **§51.1544 [Reserved].**

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<sup>2</sup> Potatoes in containers bearing official State Seed Certification Tags and Seals are not required to be fairly clean but shall be free from damage by dirt.

## **Size**

### **§51.1545 Size.**

- (a) The minimum size, or minimum and maximum sizes may be specified in connection with the grade in terms of diameter or weight of the individual potato, or in accordance with one of the size designations in Table I or Table II: **Provided,** That sizes so specified shall not be in conflict with the basic size requirements for the grade.
- (b) When size is designated as shown in Table II, the corresponding weight ranges shall apply. These size designations may be applied to potatoes packed in any size container: **Provided,** That the weight ranges are within the limits specified.

**Table I**

Size designation	Minimum diameter <sup>1</sup> or weight		Maximum diameter <sup>1</sup> or weight	
	Inches	Ounces	Inches	Ounces
Creamer	3/4	( <sup>3</sup> )	1-5/8	( <sup>3</sup> )
Chef	2-3/4	8	4-1/2	28
Size A <sup>2</sup> .....	1-7/8	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Size B.....	1-1/2	( <sup>3</sup> )	2-1/4	( <sup>3</sup> )
Small.....	1-3/4	( <sup>3</sup> )	2-1/2	6
Medium.....	2-1/4	5	3-1/4	10
Large.....	3	10	4-1/2	28

<sup>1</sup>Diameter means the greatest dimension at right angles to the longitudinal axis, without regard to the position of the stem end.

<sup>2</sup>In addition to the minimum size specified, a lot of potatoes designated as Size A shall contain at least 40 percent of potatoes which are 2-1/2 inches in diameter or larger or 6 ounces in weight or larger.

<sup>3</sup>No requirement.

**Table II**

[Ounces]

Size designation	Minimum weight	Maximum weight
Under 50.....	15	.....
50.....	12	19
60.....	10	16
70.....	9	15
80.....	8	13
90.....	7	12
100.....	6	10
110.....	5	9
120.....	4	8
130.....	4	8
140.....	4	8
Over 140.....	4	8

## **Tolerances**

### **§51.1546 Tolerances.**

To allow for variations incident to proper grading and handling in each of the foregoing grades, the following tolerances by weight or equivalent basis, are provided as specified.

(a) **For defects -- (1) U.S. No. 1. At Shipping Point.** A total of 8 percent for potatoes in any lot which fail to meet the requirements for the grade: **Provided**, That included in this tolerance not more than the following percentages shall be allowed for the defects listed:

- (i) 5 percent for external defects;
- (ii) 5 percent for internal defects; or,
- (iii) including therein not more than 1 percent for potatoes which are frozen or affected by soft rot or wet breakdown. See §51.1547.

(2) **En route or at Destination.** A total of 10 percent for potatoes in any lot which fail to meet the requirements for the grade: **Provided**, That included in this tolerance not more than the following percentages shall be allowed for the defects listed:

- (i) 7 percent for external defects;
- (ii) 7 percent for internal defects;
- (iii) including therein not more than 2 percent for potatoes which are frozen or affected by soft rot or wet breakdown. See §51.1547.

(3) **U.S. Commercial.** A total of 20 percent for potatoes in any lot which fail to meet the requirements for the grade: **Provided**, That included in this tolerance not more than the following percentages shall be allowed for the defects listed:

- (i) 10 percent for potatoes which fail to meet the requirements for U.S. No. 2 grade, including therein not more than:
- (ii) 6 percent for external defects;
- (iii) 6 percent for internal defects; or,
- (iv) including therein not more than 1 percent for potatoes which are frozen or affected by soft rot or wet breakdown. See §51.1547.

(4) **U.S. No. 2. At Shipping Point.** A total of 10 percent for potatoes in any lot which fail to meet the requirements for the grade: **Provided**, That included in this tolerance not more than the following percentages shall be allowed for the defects listed:

- (i) 6 percent for external defects;
- (ii) 6 percent for internal defects; or,
- (iii) including therein not more than 1 percent for potatoes which are frozen or affected by soft rot or wet breakdown. See §51.1547.

(5) **En route or at Destination:** A total of 12 percent for potatoes in any lot which fail to meet the requirements for the grade: **Provided**, That included in this tolerance not more than the following percentages shall be allowed for the defects listed:

- (i) 8 percent for external defects;
- (ii) 8 percent for internal defects;
- (iii) including therein not more than 2 percent for potatoes which are frozen or affected by soft rot or wet breakdown. See §51.1547.

(b) **For off-size.** (1) Not more than 3 percent of the potatoes in any lot may be smaller than the required or specified minimum size except that a tolerance of 5 percent shall be allowed for potatoes packed to meet a minimum size of 2-1/4 inches or larger in diameter or 5 ounces or

more in weight. In addition, not more than 10 percent may be larger than any required or specified maximum size. See §51.1547.

(2) When a percentage of the potatoes is specified to be of a certain size and larger, individual samples shall have not less than one-half of the percentage specified: **Provided**, That the average for the entire lot is not less than the percentage specified.

#### **Application of Tolerances**

##### **§51.1547 Application of tolerances.**

Individual samples shall have not more than double the tolerances specified, except that at least one defective and one off-size potato may be permitted in any sample: **Provided**, That en route or at destination one-tenth of the samples may contain three times the tolerance permitted for potatoes which are frozen or affected by soft rot or wet breakdown. **And provided further**, That the averages for the entire lot are within the tolerances specified for the grade.

#### **Samples for Grade and Size Determination**

##### **§51.1548 Samples for grade and size determination.**

Individual samples shall consist of at least 20 pounds. When individual packages contain at least 20 pounds, each individual sample is drawn from one package; when packages contain less than 20 pounds, a sufficient number of adjoining packages are opened to provide at least a 20-pound sample. The number of such individual samples drawn for grade and size determination will vary with the size of the lot.

#### **Skinning**

##### **§51.1549 Skinning.**

(a) The following definitions provide a basis for describing lots of potatoes as to the degree of skinning whenever description may be appropriate:

- (1) "Practically no skinning" means that not more than 5 percent of the potatoes in the lot have more than one-tenth of the skin missing or "feathered";
- (2) "Slightly skinned" means that not more than 10 percent of the potatoes in the lot have more than one-fourth of the skin missing or "feathered";
- (3) "Moderately skinned" means that not more than 10 percent of the potatoes in the lot have more than one-half of the skin missing or "feathered"; and
- (4) "Badly skinned" means that more than 10 percent of the potatoes in the lot have more than one-half of the skin missing or "feathered."

#### **Definitions**

##### **§51.1550 Similar varietal characteristics.**

"Similar varietal characteristics" means that the potatoes in any lot have the same general shape, color and character of skin, and color of flesh.

##### **§51.1551 Firm.**

"Firm" means that the potato is not shriveled or flabby.

##### **§51.1552 Clean.**

"Clean" means that at least 90 percent of the potatoes in any lot are practically free from dirt or staining and practically no loose dirt or other foreign matter is present in the container.

**§51.1553 Fairly clean.**

"Fairly clean" means that at least 90 percent of the potatoes in any lot are reasonably free from dirt or staining and not more than a slight amount of loose dirt or foreign matter is present in the container.

**§51.1554 Mature.**

"Mature" means that the skins of the potatoes are generally firmly set and not more than 5 percent of the potatoes in the lot have more than one-tenth of the skin missing or "feathered."

**§51.1555 Fairly well matured.**

"Fairly well matured" means that the skins of the potatoes are generally fairly firmly set and not more than 10 percent of the potatoes in the lot have more than one-fourth of the skin missing or "feathered."

**§51.1556 Well shaped.**

"Well shaped" means that the potato has the normal shape for the variety.

**§51.1557 Fairly well shaped.**

"Fairly well shaped" means that the potato is not materially pointed, dumbbell-shaped or otherwise materially deformed.

**§51.1558 Seriously misshapen.**

"Seriously misshapen" means that the potato is seriously pointed, dumbbell-shaped or otherwise badly deformed.

**§51.1559 Injury.**

"Injury" means any defect, or any combination of defects, which more than slightly detracts from the edible or marketing quality, or the internal or external appearance of the potato, or any internal defect outside of or not entirely confined within the vascular ring which cannot be removed without a loss of more than 3 percent of the total weight of the potato.

**§51.1560 Damage.**

"Damage" means any defect, or any combination of defects, which materially detracts from the edible or marketing quality, or the internal or external appearance of the potato, or any external defect which cannot be removed without a loss of more than 5 percent of the total weight of the potato. See Tables III and IV.

**§51.1561 Serious damage.**

"Serious damage" means any defect, or any combination of defects, which seriously detracts from the edible or marketing quality, or the internal or external appearance of the potato, or any external defect which cannot be removed without a loss of more than 10 percent of the total weight of the potato. See Tables III and IV.

**§51.1562 Freezing.**

"Freezing" means that the potato is frozen or shows evidence of having been frozen.

**§51.1563 Soft rot or wet breakdown.**

"Soft rot or wet breakdown" means any soft, mushy, or leaky condition of the tissue such as slimy soft rot, leak, or wet breakdown following freezing injury.

**§51.1564 External defects.**

"External defects" are defects which can be detected externally. However, cutting may be required to determine the extent of the injury. Some external defects are listed in Table III.



**Table III - External Defects**

<b>Defects</b>	<b>Damage</b>	<b>Serious Damage<sup>1</sup></b>
Air Cracks	When removal causes a loss of more than 5 percent of the total weight of the potato or when the air crack(s) affects more than 1/3 the length or diameter of the potato (whichever is greater) in the aggregate.	When removal causes a loss of more than 10 percent of the total weight of the potato or when the air crack(s) affects more than 3/4 the length or diameter of the potato (whichever is greater) in the aggregate.
Artificial Coloring	When unsightly or when concealing any defect causing damage or when penetrating the flesh and removal causes loss of more than 5 percent of total weight of potato.	When concealing a serious defect or when penetrating into the flesh and removal causes loss of more than 10 percent of total weight of potato.
Bruises (Not including pressure bruise and sunken discolored areas)	When removal causes a loss of more than 5 percent of the total weight of the potato or when the area affected is more than 5 percent of the surface in the aggregate (i.e. 3/4 inch on a 2-1/2 inch or 6 oz. potato). Correspondingly lesser or greater areas in smaller or larger potatoes.	When removal causes a loss of more than 10 percent of the total weight of the potato or when the area affected is more than 10 percent of the surface in the aggregate (i.e. 1-1/4 inches on a 2-1/2 inch or 6 oz. potato). Correspondingly lesser or greater areas in smaller or larger potatoes.
Cuts	When one smooth cut affects more than 5 percent of the surface area.	Cut(s) that affect more than 10 percent of the surface area in the aggregate or when a single side cut extends beyond 1/2 the length of the potato.
Dirt	When materially detracting from the appearance of the potato.	When seriously detracting from the appearance of the potato.
Elephant Hide	When affecting over 10 percent of the surface area of the potato.	When affecting over 25 percent of the surface area.
Enlarged Lenticels	When materially detracting from the appearance of the potato.	When seriously detracting from the appearance of the potato.
External Discoloration (Areas that are light tan or lighter in color and blends should be ignored.)	When more than 30 percent of the surface is affected by light tan or light brown colors which do not blend or when more than 15 percent of the surface is affected by colors darker than light tan or light brown.	When more than 60 percent of the surface is affected by light tan or light brown colors which do not blend or when more than 30 percent of the surface is affected by colors darker than light tan or light brown.

<b>Defects</b>	<b>Damage</b>	<b>Serious Damage<sup>1</sup></b>
Flattened or Depressed Areas/Pressure Bruises	When removal of underlying discolored flesh causes a loss of more than 5 percent of the total weight of the potato or when the flattened or depressed area(s) covers more surface area than allowed in Table IV. (See Table IV.)	When removal of underlying discolored flesh causes a loss of more than 10 percent of the weight of the potato or when the flattened depressed area(s) covers more surface area than allowed in the Table IV. (See Table IV.)
Flea Beetle Injury	When materially detracting from the appearance or when removal causes a loss of more than 5 percent of the total weight of the potato or when the area affected is more than 5 percent of the surface in the aggregate.	When seriously detracting from the appearance of the potato or when removal causes a loss of more than 10 percent of the weight of the potato or when the area affected is more than 10 percent of the surface in the aggregate.
Greening	When removal causes a loss of more than 5 percent of the total weight of the potato or when green color affects more than 25 percent of the surface in the aggregate.	When removal causes a loss of more than 10 percent of the weight of the potato or when green color affects more than 50 percent of the surface in the aggregate.
Growth Cracks	When the growth crack(s) affects more than 1/2 the length of the potato in the aggregate on round varieties or more than 1/3 the length in the aggregate on long varieties; or, when the depth is greater than that as outlined in Table V. (See Table V.)	When the growth crack(s) affects more than 3/4 the length of the potato in the aggregate or when the depth is greater than that as outlined in Table V. (See Table V.)
Grub Damage	When removal causes a loss of more than 5 percent of the total weight of the potato or when affecting more than 5 percent of the surface area (i.e. more than 3/4 inch on a 2-1/2 inch or 6 ounce potato). Correspondingly lesser or greater areas in smaller or larger potatoes.	When removal causes a loss of more than 10 percent of the total weight of the potato or when affecting more than 10 percent of the surface area (i.e. more than 1-1/4 inch on a 2-1/2 inch or 6 ounce potato). Correspondingly lesser or greater areas in smaller or larger potatoes.
Insects or Worms	(See Serious Damage.)	When present inside the potato.
Nematode (Root Knot)	When removal causes loss of more than 5 percent of total weight of potato.	When removal causes loss of more than 10 percent of total weight of potato.
Rhizoctonia	When affecting more than 15 percent of the surface in the aggregate.	When affecting more than 50 percent of the surface in the aggregate.

<b>Defects</b>	<b>Damage</b>	<b>Serious Damage<sup>1</sup></b>
Rodent or Bird Damage	When removal causes a loss of more than 5 percent of the total weight of the potato or when affecting more than 5 percent of the surface area (i.e. more than 3/4 inch on a 2-1/2 inch or 6 ounce potato). Correspondingly lesser or greater areas in smaller or larger potatoes.	When removal causes a loss of more than 10 percent of the total weight of the potato or when affecting more than 10 percent of the surface area (i.e. more than 1-1/4 inch on a 2-1/2 inch or 6 ounce potato). Correspondingly lesser or greater areas in smaller or larger potatoes.
Russetting (On Non Russet Type)	When more than 50 percent of the surface is affected in the aggregate.	N/A
Scab, Pitted	When removal causes a loss of more than 5 percent of the total weight of the potato or when scab affects an aggregate area of more than 1/2 inch. (Based on a potato 2-1/2 inches in diameter or 6 oz. in weight.) Correspondingly lesser or greater areas in smaller or larger potatoes.	When the removal causes a loss of more than 10 percent of the total weight of the potato or when scab affects an aggregate area of more than 1 inch. (Based on a potato 2-1/2 inches in diameter or 6 oz. in weight.) Correspondingly lesser or greater areas in smaller or larger potatoes.
Scab, Russet	Smooth and affecting more than 1/3 of the surface or rough russet scab which affects more than 10 percent of the surface in the aggregate.	Rough and affecting more than 25 percent of the surface in the aggregate.
Scab, Surface	When more than 5 percent of the surface in the aggregate is affected.	When more than 25 percent of the surface in the aggregate is affected.
Second Growth	When materially detracting from the appearance of the potato.	When seriously detracting from the appearance of the potato.
Silver Scurf	When affecting more than 50 percent of the surface area of the potato.	When its severity causes a wrinkling of the skin over more than 50 percent of the surface.
Sprouts	Not more than 5 percent of the potatoes in a lot may have individual or clusters of sprouts not more than 1/4 inch at shipping point and 1/2 inch at destination.	Not more than 10 percent of the potatoes in a lot may have individual or clusters of sprouts not more than 1/2 inch at shipping point and 1 inch at destination.
Sunburn	When removal causes loss of more than 5 percent of total weight of potato.	When removal causes loss of more than 10 percent of total weight of potato.
Sunken Discolored Areas	<b>SEE TABLE VI</b>	<b>SEE TABLE VI</b>

Defects	Damage	Serious Damage <sup>1</sup>
Surface Cracks (Areas affected by fine net-like cracking should be ignored.)	When smooth shallow cracking affects more than 1/3 of the surface or when rough deep cracking affects more than 5 percent of the surface.	When rough deep cracking affects more than 10 percent of the surface.
Wireworm or Grass Damage	When affecting the flesh of the potato and removal causes loss of more than 5 percent of total weight of potato.	When affecting the flesh of the potato and removal causes loss of more than 10 percent of total weight of potato.

<sup>1</sup> The following defects are considered serious damage when present in any degree: 1. Freezing. 2. Late blight. 3. Ring rot. 4. Southern bacterial wilt. 5. Soft rot. 6. Wet breakdown.

**Table IV**  
**Flattened or Depressed Areas - Pressure Bruises Maximum Area Allowed**

Diameter	Weight	U.S. No. 1 (aggregate area)	U.S. No. 2 (aggregate area)
Potato is:	Potato is:	Not more than:	Not more than:
Less than 2 in.	Less than 4 oz.	1/2 in.	1 in.
2 to 2-1/2 in.	4 to 6 oz.	1 in.	1-1/2 in.
More than 2-1/2 to 3 in.	More than 6 to 8 oz.	1-1/4 in.	1-3/4 in.
More than 3 to 3-1/2 in.	More than 8 to 14 oz.	1-1/2 in.	1-7/8 in.
More than 3-1/2 to 4 in.	More than 14 to 20 oz.	1-3/4 in.	2 in.
More than 4 to 4-1/2 in.	More than 20 to 28 oz.	2 in.	2-1/4 in.
More than 4-1/2 to 5 in.	More than 28 to 36 oz.	2-1/4 in.	2-3/4 in.
More than 5 in.	More than 36 oz.	2-1/2 in.	3-1/4 in.

**Table V**  
**Depth Allowed For Growth Cracks**

Diameter	Weight	U.S. No. 1 (Depth)	U.S. No. 2 (Depth)
Potato is:	Potato is:	Not more than:	Not more than:
Less than 2 in.	Less than 4 oz.	1/8 in.	1/4 in.
2 to 2-1/2 in.	4 to 6 oz.	1/4 in.	3/8 in.
More than 2-1/2 to 3 in.	More than 6 to 8 oz.	3/8 in.	1/2 in.
More than 3 in.	More than 8 oz.	1/2 in.	5/8 in.

**Table VI**  
**Sunken Discolored Areas Maximum Area Allowed**

<b>Diameter</b>	<b>Weight</b>	<b>U.S. No. 1 (aggregate area)</b>	<b>U.S. No. 2 (aggregate area)</b>
Potato is:	Potato is:	Not more than:	Not more than:
Less than 2 in.	Less than 4 oz.	3/8 in.	3/4 in.
2 to 2-1/2 in.	4 to 6 oz.	3/4 in.	1 in.
More than 2-1/2 to 3 in.	More than 6 to 8 oz.	1 in.	1-1/4 in.
More than 3 to 3-1/2 in.	More than 8 to 14 oz.	1-1/4 in.	1-1/2 in.
More than 3-1/2 to 4 in.	More than 14 to 20 oz.	1-1/2 in.	1-3/4 in.
More than 4 to 4-1/2 in.	More than 20 to 28 oz.	1-3/4 in.	2 in.
More than 4-1/2 to 5 in.	More than 28 to 36 oz.	2 in.	2-1/4 in.
More than 5 in.	More than 36 oz.	2-1/4 in.	2-1/2 in.

**§51.1565 Internal defects.**

"Internal defects" are defects which cannot be detected without cutting the potato. Some internal defects are listed in Table I.

**Table I -- Internal Defects**

<b>DEFECTS</b>	<b>DAMAGE Maximum Allowed</b>	<b>SERIOUS DAMAGE Maximum Allowed</b>
<b>Occurring outside of or not entirely confined to the vascular ring</b>		
Ingrown Sprouts, Internal Black Spot, Internal Discoloration, Vascular Browning, Fusarium Wilt, Net Necrosis, Other Necrosis, Stem End Browning	5% waste	10% waste
Internal Black Spot	When the spot(s) are darker than the official color chip (POT-CC-2) after removing 5 percent of the total weight of the potato.	When the spot(s) are darker than the official color chip (POT-CC-2) after removing 10 percent of the total weight of the potato.
<b>Occurring entirely within the vascular ring</b>		
Hollow Heart or Hollow Heart with Discoloration	Area affected not to exceed that of a circle 1/2 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>	Area affected not to exceed that of a circle 3/4 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>
Light Brown Discoloration (Brown Center)	Area affected not to exceed that of a circle 1/2 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>	Area affected not to exceed that of a circle 3/4 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>
Internal Brown Spot and Similar Discoloration (Heat Necrosis)	Not more than the equivalent of 3 scattered spots 1/8 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>	Not more than the equivalent of 6 scattered spots 1/8 inch in diameter in a potato 2-1/2 inches in diameter or 6 ounces in weight. <sup>1</sup>

<sup>1</sup> Note: Correspondingly lesser or greater areas in smaller or larger potatoes.

**Metric Conversion Table**  
**§51.1566 Metric conversion table.**

<b>Ounces</b>	<b>Grams</b>
1 equals .....	28.35
4 equals .....	113.40
5 equals .....	141.75
6 equals .....	170.10
7 equals .....	198.45
8 equals .....	226.80
9 equals .....	255.15
10 equals .....	283.50
12 equals .....	340.20
14 equals .....	396.90
16 equals .....	453.60
18 equals .....	510.30
19 equals .....	538.60
20 equals .....	567.00

<b>Inches</b>	<b>Millimeters (mm)</b>
1/8 equals .....	3.2
1/4 equals .....	6.4
1/2 equals .....	12.7
3/4 equals .....	19.1
1 equals .....	25.4
1-1/2 equals .....	38.1
2 equals .....	50.8
2-1/2 equals .....	63.5
3 equals .....	76.2
3-1/2 equals .....	88.9
4 equals .....	101.6
4-1/2 equals .....	114.3